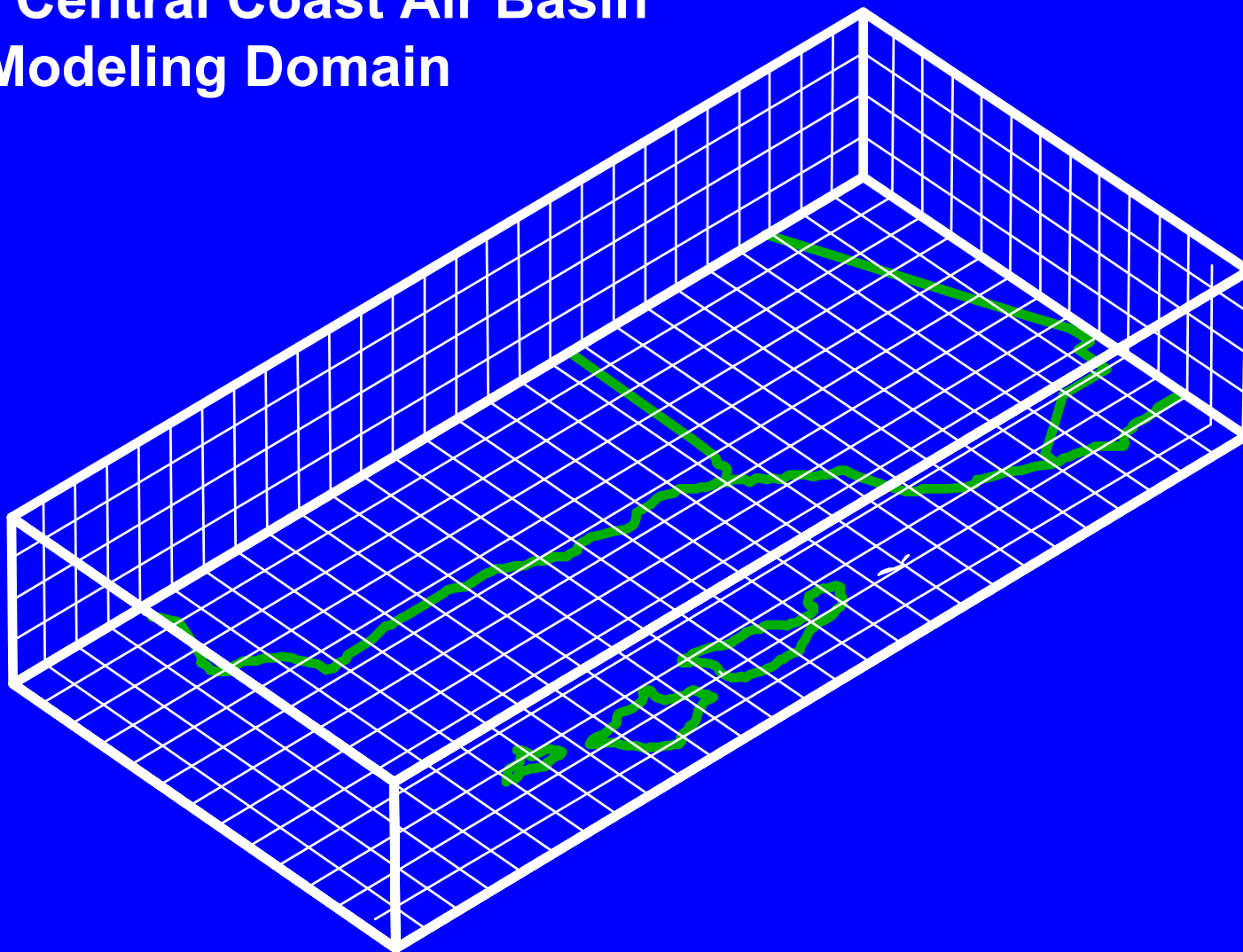


# South Central Coast Air Basin Modeling Domain



# Atmospheric Chemistry

- Mechanism Includes 45-85 Species
- Hundreds of Reactions
- Many Species Participate in Multiple Reactions
- Research Has Shown that 1 gram of HC can Produce More than 1 gram of Ozone

# MIR Examples

- Crop:

1.0g Beta-Pinene Produces 4.4 g Ozone

- Fuel:

1.0g Toluene Produces 2.7 g Ozone

# **Atmospheric Transport (“Advection”)**

**Horizontal and Vertical winds**

# **Atmospheric Diffusion**

**Turbulence causes pollutants to move from high concentrations to low concentrations**

# Emissions

# **Dry-Gas Deposition**

**Pollutants can be removed by contact or reaction with any surface**

# Photochemical Grid Model Inputs



# **Air Quality Inputs**

**Initial Conditions**

**Boundary Conditions**

# **Geographic Inputs**

**Land Use**

**Surface Elevation**

# **Meteorological Inputs**

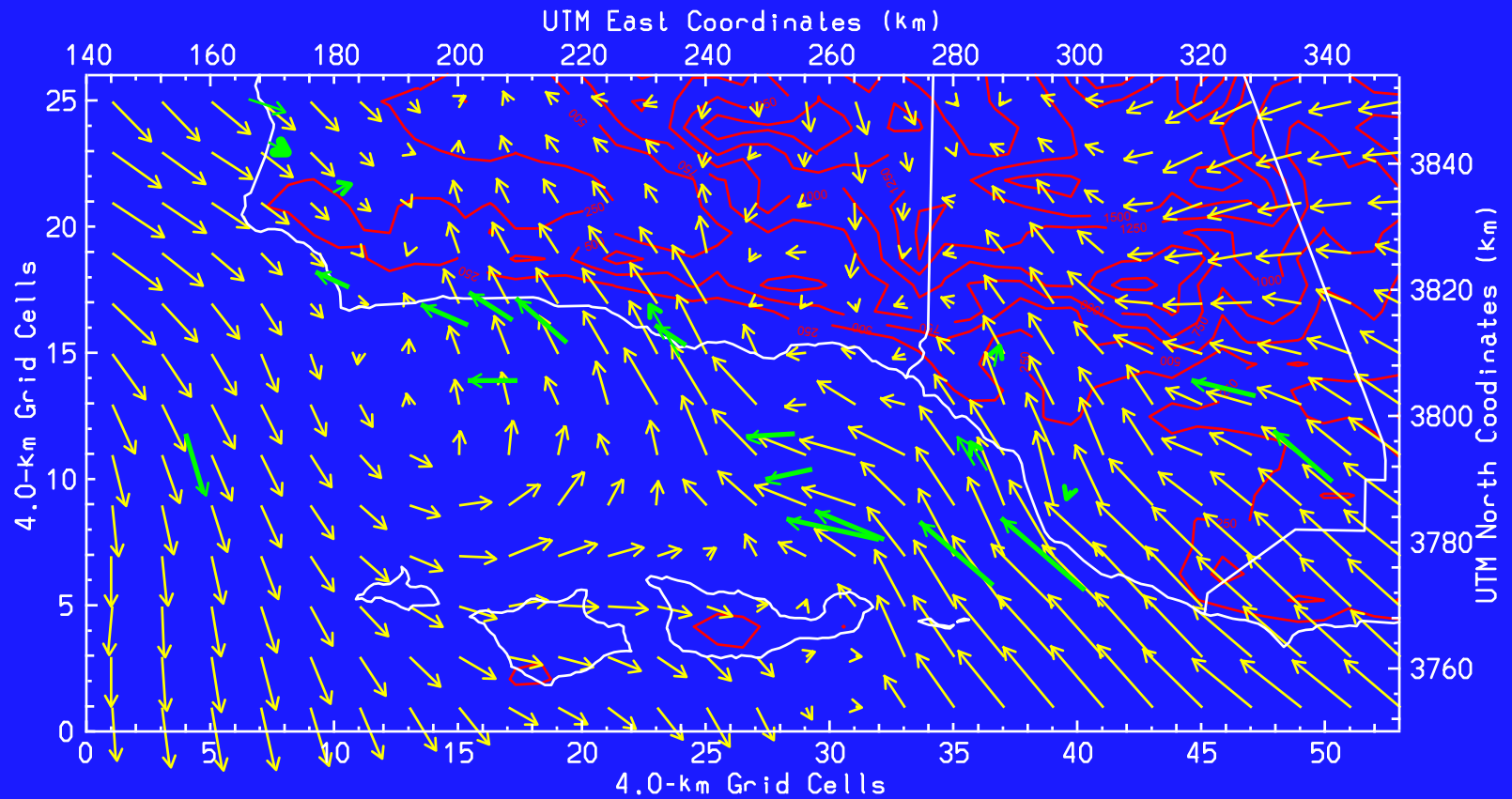
**Wind speed and Direction**

**Air Temperature**

**Humidity**

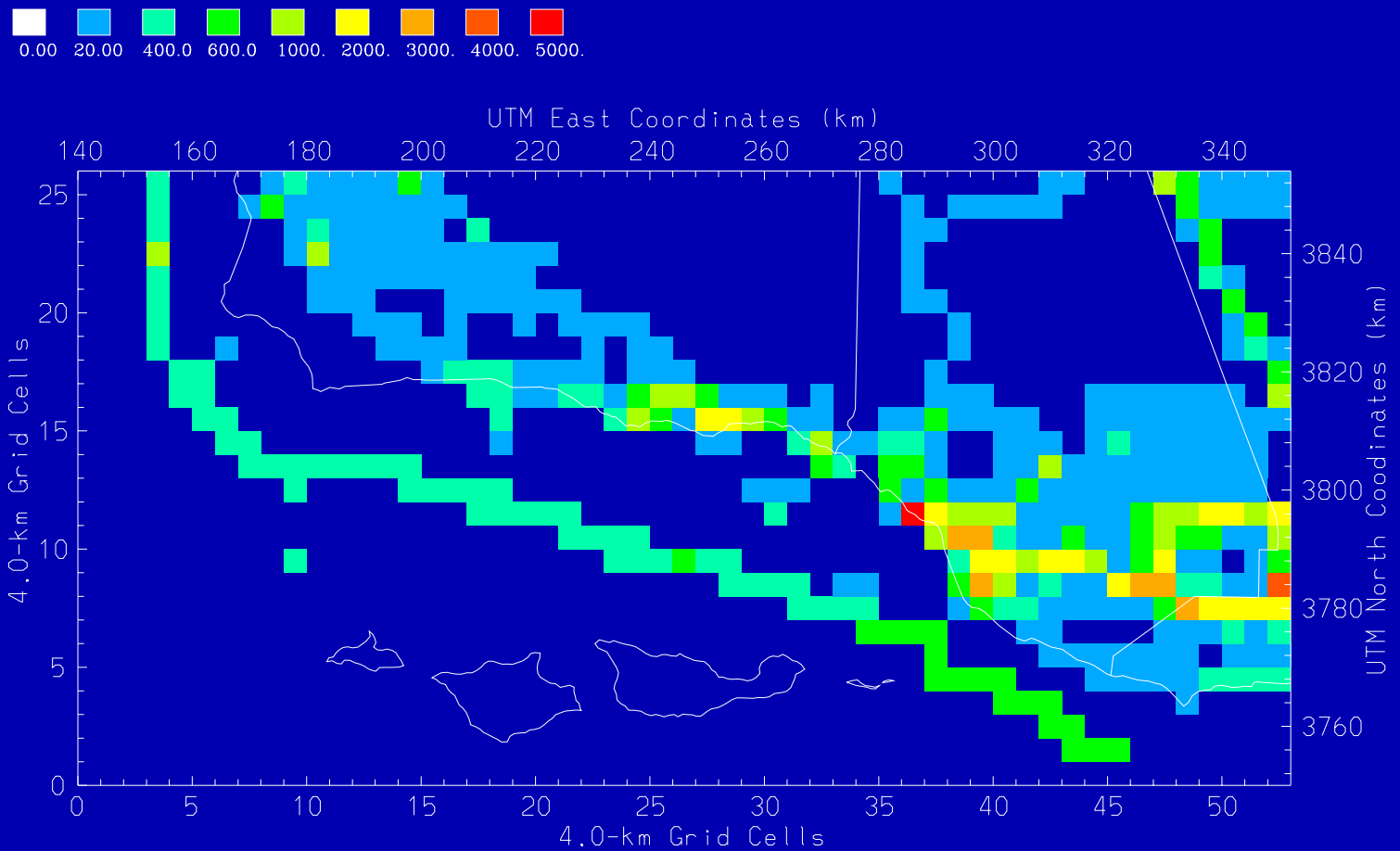
**Solar Radiation Intensity**

**Mixing Heights**



**Figure 6. Surface-layer wind fields for September 7, 1984 at 0800 PDT simulated using the Diagnostic Wind Model (DWM, 1991).**

# Gridded Emissions Inventory



**Figure 8. Area source NO<sub>x</sub> emissions (g-mole/hr) for the South Central Coast air base on September 7, 1984 at 1700 PDT.**

# Model Output

## Hourly Pollutant Concentrations

# **Dry-Gas Deposition (cont)**

**Atmospheric Turbulence**

**Near-Surface Diffusion**

**Plant Canopy Effects \*\***

**\*\* In an air quality model, defined by  
Land Use Category**



# **Land Use Categories in Most Air Quality Models**

- |  |   |
|--|---|
| <b>1. Urban</b>                          | <b>6. Mixed Forest</b>                  |
| <b>2. Agriculture</b>                    | <b>7. Water</b>                         |
| <b>3. Rangeland</b>                      | <b>8. Barren Land</b>                   |
| <b>4. Deciduous Forest</b>               | <b>9. Non-Forest Wetlands</b>           |
| <b>5. Coniferous Forest/<br/>Wetland</b> | <b>10. Mixed Agriculture/<br/>Range</b> |
|  | <b>11. Rocky with low shrubs</b>        |

# Models In Use

**SAQM (ARB, 1990)**

**CMAQ (USEPA, 1996)**

**CAMX (ENVIRON, 1992)**

# Differences Between Episodes

**Meteorology**  
**Emissions**

# **Assessing Impacts From Agricultural Crops**

**Ozone Uptake**

**Production of Ozone Precursors**